



# K'NEX: Solar Power

**Amount of time Demo takes: 2-5 minutes**

**Try this at home!**

## Lesson's Big Idea

- The solar panel reacts to light (photons) from the sun or light bulb. This then powers the motor to turn the gears which makes the man “run”. The capacitor can hold the energy from the panel and be used at a later point.

## Materials

- [K'NEX Education - Investigating Solar Energy Set](#)
  - o Motor
  - o Capacitor
  - o Solar panel (2)
  - o Power cord (2)
  - o Manual
  - o Running man setup
- 100 Watt light bulbs (4)
- Lamp needs sunlight

## SAFETY!

- Light bulb gets very hot after extended use. Do not touch!

## Background Information

- Capacitor- a device used to store an electric charge, consisting of one or more pairs of conductors separated by an insulator.
- Photon- a particle representing a quantum of light or other electromagnetic radiation. A photon carries energy proportional to the radiation frequency but has zero rest mass.

## Instructional Procedure

1. Set up lamp with solar panel beneath it, make sure panel is 9 cm below the lamp so it doesn't overheat and melt. If the demonstration is outside in the view of sunlight, point the solar panels toward the sun.

2. Make sure the running man is still fully intact.
3. Plug the power cord into the motor and the solar panel, making sure the +’s and –’s are properly lined up. Once the solar panel is under the light the man should start moving. See the manual for troubleshooting.
4. The solar panel can be used to charge the capacitor which can be used to run the man. Again make sure the +’s and –’s are properly lined up.

### Assessment Questions

- What is a gear? What products use gears?
  - Answer: Wheels with teeth that will transfer mechanical work to another wheel.
- What happens if the solar panel is flipped upside down or is covered?
  - Answer: Since there is a capacitor connected to the running man, the capacitor will continue to power the motor until it has no charge.
- What can be used to power a solar panel? What is a particle of light called?
  - Answer: Sunlight or a light source! A particle of light is called a photon.

### Careers & Real World Applications

- As the world is moving away from nonrenewable sources for electricity, the use of solar panels are increasing in houses.
- **Careers:**
  - Electrical Engineer
  - Mechanical Engineer
  - Solar Panel Technician

### Clean Up

- Carefully dispose of broken light bulbs, request new ones.
- Carefully place the K’NEX Running man away carefully.

### References

- K’NEX Renewable Energy Set:
  - <http://www.knex.com/shop/17414/renewable-energy/>

### Related Next Generation Science Standards

- K-5

- K-PS2 Motion and Stability: Forces and Interactions
- K-ESS2 Earth's Systems
- K-ESS3 Earth and Human Activity
- 3-PS2 Motion and Stability: Forces and Interactions
- 4-PS3 Energy
- 4-ESS3 Earth and Human Activity
- 5-ESS3 Earth and Human Activity
- 6-8
  - MS-PS2 Motion and Stability: Forces and Interactions
  - MS-ESS3 Earth and Human Activity
- 9-12
  - HS-PS2 Motion and Stability: Forces and Interactions
  - HS-PS3 Energy
  - HS-PS4 Waves and Their Applications in Technologies for Information Transfer